

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
Bldg. 202 Rm. 211
Gaithersburg, Maryland 20899

SRM Number: 3152a
MSDS Number: 3152a
SRM Name: Sodium Standard Solution
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Sodium Standard Solution

Description: SRM 3152a is a single element solution prepared gravimetrically to contain a nominal 10 mg/g of sodium with a nitric acid volume fraction of 10 %.

Other Designations: Sodium in Nitric Acid (aqua fortis; hydrogen nitrate; azotic acid; engraver's acid); Sodium Nitrate* (sodium trinitrate; sodium (III) nitrate; nitric acid sodium salt; sodium nitrate anhydrous) in Standard Solution

Name	Chemical Formulas	CAS Registration Numbers
Nitric Acid	HNO ₃	7697-37-2
Sodium Nitrate	NaNO ₃	7631-99-4
Sodium	Na	7440-23-5

DOT Classification: Nitric Acid, Solution, UN2031

Manufacturer/Supplier: Available from a number of suppliers

* The addition of sodium to nitric acid, along with other intermediate chemical reactions, forms sodium nitrate which will precipitate upon evaporation or drying of the solution.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Nitric Acid	10	ACGIH TLV-TWA: 2 mg/kg or 5 mg/m ³
		OSHA TLV-TWA: 2 mg/kg or 5 mg/m ³
		Human, Oral: LD _{LO} : 430 mg/kg
Sodium Nitrate	3.70	No TLV-TWA established
		Woman, Oral: TD _{LO} : 14 mg/kg
		Child, Oral: LD _{LO} : 22.5 mg/kg
		Rat, Oral: LD ₅₀ : 1267 mg/kg
Sodium	1	No TLV-TWA established
		Rat, Intraperitoneal: LD ₅₀ : 4 g/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Nitric Acid	Sodium Nitrate	Sodium
Appearance and Odor: a white to slightly yellow liquid that darkens to a brownish color upon aging and exposure to light; pungent odor	Appearance and Odor: an odorless, colorless to white deliquescent crystal or powder with a slightly bitter saline taste	Appearance and Odor: an odorless gray solid
Relative Molecular Mass: 63.02	Relative Molecular Mass: 84.99	Relative Atomic Mass: 22.99
Density: 1.054 (10 % nitric acid)	Density: 2.261	Density: 0.97
Solubility in Water: soluble	Solubility in Water: soluble	Solubility in Water: reacts violently with water
Solvent Solubility: decomposes in alcohol	Solvent Solubility: soluble in alcohol, methanol, and ammonia	Solvent Solubility: decomposes in alcohol. Insoluble in benzene, naphtha, kerosene, and ether

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this sodium/nitric acid solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

Method Used: N/A

Autoignition Temperature: N/A

Flammability Limits in Air (Volume %):

UPPER: N/A

LOWER: N/A

Unusual Fire and Explosion Hazards: Although nitric acid does not burn, it is a powerful oxidizing agent that can react with combustible materials to cause fires. Sodium is a severe fire hazard; dust/air mixtures may ignite or explode. Sodium nitrate is a negligible fire hazard when exposed to heat or flame.

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire. Use a water spray to dilute nitric acid and to absorb liberated oxides of nitrogen.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: X Stable Unstable

Conditions to Avoid: Avoid contact with incompatible materials.

Incompatibility (Materials to Avoid): Keep nitric acid away from organic materials, plastics, rubber and some forms of coatings. Nitric acid is incompatible with chlorine and metal ferrocyanide. Sodium nitrate is incompatible with combustible materials, metals, metal salts, metal oxides, cyanides, reducing agents, and acids. Sodium is incompatible with acids, combustible materials, oxidizing materials, metals, metal salts, bases, metal oxides, halogens, reducing agents, halo carbons, peroxides, and metal carbides.

See Section IV: *Unusual Fire and Explosion Hazards*

Hazardous Polymerization:	Will Occur	X	Will Not Occur
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Route of Entry: **X** **Inhalation** **X** **Skin** **X** **Ingestion**

Sodium: Sodium may react with moisture to form sodium hydroxide, an alkaline corrosive. Inhalation of the alkaline material can cause irritation of the respiratory tract with coughing, choking, pain, and possibly burns of the mucous membranes. In some cases, *pulmonary edema* may develop, either immediately in severe cases or more often with a latent period of 5 to 72 hours. Symptoms may include tightness in the chest, *dyspnea*, frothy sputum, *cyanosis*, and dizziness. Physical findings may include *hypotension*, weak and rapid pulse, and moist rales. Severe cases may be fatal. Repeated or prolonged exposure may cause inflammatory and ulcerative changes in the mouth and possibly bronchial and gastrointestinal disturbances.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u> </u>	<u>X</u>
In the International Agency for Research on Cancer (IARC) Monographs	<u> </u>	<u>X</u>
By the Occupational Safety and Health Administration (OSHA)	<u> </u>	<u>X</u>

Ingestion: If ingestion occurs, wash out mouth with water. **DO NOT** induce vomiting. Obtain medical assistance immediately.

NOTE (Nitric Acid): Wash affected skin areas with 5 % solution of sodium bicarbonate (NaHCO_3). If ingested, the risk versus the benefit of the passage of a naso-gastric tube is debatable. Activated charcoal is of no value. **DO NOT** give the exposed person bicarbonate to neutralize the material.

TARGET ORGAN(S) OF ATTACK: **Nitric Acid:** Skin, teeth, eyes, and upper respiratory tract
 Sodium and Sodium Nitrate: Skin, mucous membranes, and upper respiratory tract

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of spills. Surfaces contaminated with spills should be covered with soda ash or sodium bicarbonate to neutralize the acid. Place the neutralized material into containers suitable for eventual disposal, reclamation, or destruction.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Provide general and local explosion proof ventilation systems to maintain airborne concentrations below the TLV. Provide approved respiratory apparatus for nonroutine or emergency use. Use an approved filter and vapor respirator when the vapor or mist concentrations are high. Wear gloves and chemical safety glasses where contact with the liquid or high vapor concentrations may occur. An eye wash station and washing facilities should be readily available near handling and use areas. Wash exposed skin areas several times a day with soap and warm water.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Store this material at room temperature.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Sodium Metal*, June 2, 1999.
MDL Information Systems, Inc., MSDS *Sodium Nitrate*, September 10, 1998.
MDL Information Systems, Inc., MSDS *Nitric Acid*, June 2, 1999.
The Merck Index, 11th Ed., 1989.
The Sigma-Aldrich Library of Chemical Safety Data, Ed. II, 1988.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified value for this material is given on the NIST Certificate of Analysis.